CLAIMS

What is claimed is:

1. A method of controlling $SO_3$ flue gas concentration in a combustion process utilizing a SCR using a sulfurous fuel, comprising the steps of:

a) providing a combustion system with low NOx burners and SCR

b) partially combusting the fuel in a first stage to create a reducing environment;

c) maintaining the reducing environment for a sufficient time period such that $SO_3$ is reduced to $SO_2$ to achieve a desirable level of $SO_3$;

d) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;

e) reducing the remaining NOx with the SCR;

thereby reducing emissions NOx.

2. The method of claim 1, further including the step of micro-staging the first stage fuel combustion.

3. The method of claim 2, wherein the micro-staging includes the use of low-NOx burners.

4. The method of claim 1, further including the step of macro-staging the first stage of fuel combustion.

5. The method of claim 4, wherein the macro-staging is provided through the use of over-fired air.

6. The method of claim 1, further including a combination of micro-staging and macro-staging.

7. The method of claim 6, wherein the micro-staging includes the use of low-NOx burners and the macro-staging is provided by over-fired air.

8. The method of claim 1, wherein the fuel is coal.

9. A combustion furnace operated with a method of controlling $SO_3$ flue gas concentration in a combustion process utilizing a SCR using a sulfurous fuel, comprising the steps of:

a) providing a combustion furnace with low NOx burners and SCR

b) partially combusting the fuel in a first stage to create a reducing environment;

c) maintaining the reducing environment for a sufficient time period such that reducible acids are reduced to achieve a desirable acidity concentration in the flue gas;

d) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;

e) reducing the remaining NOx with the SCR;

thereby controlling the flue gas $SO_3$ levels going to the SCR.

10. The method of claim 9, further including the step of micro-staging the first stage fuel combustion.

11. The method of claim 10, wherein the micro-staging is provided through the use of low-NOx burners.

12. The method of claim 9, further including the step of macro-staging the first stage of fuel combustion.

13. The method of claim 12, wherein the macro-staging is provided through the use of over-fired air.

14. The method of claim 9, further including a combination of micro-staging and macro-staging.

15. The method of claim 14, wherein the micro-staging is provided by low-NOx burners and the macro-staging is provided by over-fired air.

16. The method of claim 9, wherein the fuel is coal.

17. A method of controlling $SO_3$ flue gas concentration in a combustion process utilizing a SCR using a sulfurous fuel, comprising the steps of:

a) providing a combustion furnace with low NOx burners and SCR

b) partially combusting the fuel in a first stage to create a reducing environment;

c) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment;

d) measuring the acid dewpoint of the flue gas;

e) adjusting the reducing environment in the first stage such that the flue gas acid dewpoint is lowered to a desirable level;

thereby controlling the $SO_3$ concentration of the flue gas.

18. The method of claim 17, wherein the step of adjusting the reducing environment includes adjusting the first stage residence time

19. The method of claim 17, further including the step of micro-staging the first stage fuel combustion.

20. The method of claim 19, wherein the micro-staging is provided through the use of low-NOx burners.

21. The method of claim 17, further including the step of macro-staging the first stage of fuel combustion.

22. The method of claim 21, wherein the macro-staging is provided through the use of over-fired air.

23. The method of claim 17, further including a combination of micro-staging and macro-staging.

24. The method of claim 23, wherein the micro-staging is provided by low-NOx burners and the macro-staging is provided by over-fired air.

25. The method of claim 17, wherein the fuel is coal.